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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,769	08/18/2003	Kitrick Sheets	1376.718US1	3898

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EXAMINER	
HOLLOWAY, DAVID A	
ART UNIT	PAPER NUMBER
2109	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/643,769	SHEETS ET AL.	
	Examiner	Art Unit	
	David A. Holloway	2109	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 1006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/26/2007 / 04/12/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-21 are pending in this application.

Specification

2. The disclosure is objected to because of the following informalities:

   a. Page 1 of the specification include data that reference copending applications. These data need to be updated.

   b. The 3rd sentence of the 3rd paragraph on page 8 of the specification is objected to. "Typically the context shift will require that an elevated privilege for the thread or stream" is grammatically incorrect.

   c. The 1st sentence of the 4th paragraph on page 9 of the specification is objected to. "it may or may need to block" is grammatically incorrect.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "operating environment" on line 4 is not clearly understood, rendering the claim indefinite. An operating environment is not only not defined, but it is also not clear how an operating environment may be executed.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 4-7, 15, 16, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nemirovsky et al. (US 6,389,449), hereinafter Nemirovsky in view of Ackerman et al. (US 5,606,696), hereinafter Ackerman.

8. As to claim 1, Nemirovsky discloses a method for scheduling program units (Fig. 1A, #105, the scheduler schedules the streams, #103), the method

comprising:

starting a process (inherent to the streams, Fig. 1A, #103) within an operating system (inherent to the system of Fig. 1A, the scheduler, #105, is part of the operating system);

starting at least one thread within the operating system (Fig. 1A, #103, each stream represents a thread), the thread associated with the process (Fig. 1A, #103);

executing a plurality of streams within the thread (Fig. 2A, forked stream, stream 2);

if a first stream must block (col. 3, line 57-62), then blocking the execution of the other streams of the plurality of streams (col. 2, lines 29-35).

9. Nemirovsky does not teach entering a kernel mode by a first stream of the plurality of streams upon the occurrence of a context shifting event.

10. However, Ackerman teaches entering a kernel mode by a first stream of the plurality of streams upon the occurrence of a context shifting event (col. 13, lines 10-12, here the context shifting event is an exception).

11. Nemirovsky and Ackerman are analogous art, because they are both from the same field of endeavor of computer systems.

12. It would have been obvious to a person having ordinary skill in the art at the time of the invention, having the teachings of Nemirovsky and Ackerman before him to

modify the multiprocessing system of Nemirovskoy by having the first stream of the plurality of streams enter into the kernel mode upon the occurrence of a context shifting event as taught by Ackerman.

13. The context shifting event, i.e., interrupt could have been due to a resource conflict, which the interstream communication system of Nimorovsky can be used to resolve. When the interrupt occurs an interrupt handler will have to be executed. In many cases an interrupt handler needs to update system registers that cannot be written to without being in kernel mode. The motivation for doing so would have been to allow the interrupt handler to update system resources such as status registers that cannot be written to in user mode. In the case of Ackerman, the exception handler needs to update the machine state register (col. 6, lines 57-59), which is a system register that can only be written in kernel mode.

14. As to claim 15, a computer-readable media having computer executable instructions for performing a method for scheduling program units, the method comprising:

starting a process within an operating system;

starting at least one thread within the operating system, the thread associated with the process;

executing a plurality of streams within the thread;

entering a kernel mode by a first stream of the plurality of streams upon the

occurrence of a context shifting event;

if the first stream must block, then blocking the execution of the other streams of the plurality of streams, the claim is inherent in the disclosures of Nemirovsky and Ackerman above.

15. As to claims 2 and 16, neither Nemirovsky nor Ackerman teaches saving the context of each of the plurality of streams in a thread context data structure.

16. However, it is well known in the art and would have been obvious to a person having ordinary skill in the art at the time of invention that preempted threads have their context saved to memory in a context data structure in order for them to be able to resume where they left off when they are awakened.

17. As to claims 4 and 18, Nemirovsky does not teach that the context shifting event is an exception. However, Ackerman teaches that the context shifting event is an exception (col. 13, lines 10-12). It would have been obvious to a person having ordinary skill in the art at the time of invention to combine the teachings of Nemivorsky and Ackerman to enter kernel mode on the occurrence of an exception. The motivation for doing so would be the same as given above for claims 1 and 15.

18. As to claims 5 and 19, neither Nemirovsky nor Ackerman teaches that the context shifting event is a signal. However, it is well known and would have been obvious to one skilled in the art at the time of invention that a signal may require

a context shift in order to load values that are needed for the signal handler, i.e., the code that needs to be executed on the occurrence of the signal, into system registers.

19. As to claims 6 and 20, neither Nemirovsky nor Ackerman teaches that the context shifting event is a non-local goto. However, it is well known and would have been obvious to one skilled in the art at the time of invention that a non-local goto requires a context shift in order to change the contents of the system registers

20. As to claims 7 and 21, neither Nemirovsky nor Ackerman teaches that the context shifting event is a system call. However, it is well known and would have been obvious to one skilled in the art at the time of invention that a system call may require a context shift in order to change the contents of the system registers

21. Claims 3, 8-14, and 17 are rejected under 35 U.S.C. 103(a) as being Unpatentable over Nemirovsky in view of Ackerman as applied to claims 1, 2, and 15 above and further in view of Summer, Jr. et al (US 4,414,624), hereinafter Summer.

22. As to claims 3, 10, and 17, neither Nemirovsky nor Ackerman disclose that each of the streams are executed on a separate processor. However, Summer teaches the partitioning of a trainer program into modules and dedicating the

process of each module, i.e., thread or subthread, to a separate microcomputer (col. 2, lines 10-13, interpret the module as being a thread, and a stream as being a subthread). Although the trainer program is not specified as being a thread of a process, the idea of dedicating a processor to a thread is there, and a subthread is a thread.

23. Nemirovsky, Ackerman, and Summer are analogous art, since they are all from the area of endeavor of computer systems.

24. It would have been obvious to a person having ordinary skill in the art at the time of the invention, having the teachings of Nemirovsky, Ackerman, and Summer before him to excecute each of the streams on a separate processor. The motivation for doing so would have been to maximize the throughput of the streams and reduce the number of resource conflicts between streams.

25. As to claim 8, Nemirovsky discloses a system for scheduling streams, the system comprising:

an operating environment executed by the processor from the memory and operable to perform the tasks of:

start a process (inherent to the streams; Fig. 1A, #103),

start at least one thread (Fig. 1A, #103, each stream represents a thread) within the operating system (inherent to the system of Fig. 1A, the scheduler, #105, is part of the operating system), the thread associated with the process;

execute a plurality of streams within the thread;

if the first stream must block (col. 3, lines 57-62), then blocking the execution of the other streams of the plurality of streams (col. 2, lines 29-35).

26. Nemirovsky does not disclose a system comprising at least one multiple processor unit having a plurality of processors; a memory coupled to the plurality of processors; and an operating environment executed by at least one of the processors from the memory.

27. However, Summer teaches a system comprising at least one multiple processor unit having a plurality of processors (Fig. 1, #30, #10, #12, and #14); a memory coupled to the plurality of processors (Fig. #24); and an operating environment executed by at least one of the processors from the memory (Fig. 1, interpret the operating environment to be the operating system that is inherent to the system of Fig. 1).

28. It would have been obvious to a person having ordinary skill in the art at the time of invention, having the teachings of Nemirovsky and Summer before him to modify the uniprocessor system of Nemirovsky by making it a multiprocessor system with shared memory as taught by Summer. The motivation for doing so would have been to enhance the performance of Nemirovsky's system by allowing threads or subthreads to be executed in parallel on separate processors (Summer, col. 2, lines 10-13, where modules are interpreted as threads/subthreads), as well as to allow the processors to communicate with

each other using shared memory, i.e., the memory coupled to the plurality of processors (Summer, col. 2, lines 61-63).

29. Neither Nemirovsky nor Summer disclose having the system enter a kernel mode by a first stream of the plurality of streams upon the occurrence of a context shifting event.

30. However, Ackerman teaches having the system enter a kernel mode by a first stream of the plurality of streams upon the occurrence of a context shifting event (Ackerman, col. 13, lines 10-12).

31. It would have been obvious to a person having ordinary skill in the art at the time of the invention, having the teachings of Nemirovsky, Summer, and Ackerman before him to modify the processor system of Nemirovsky and Summer by entering kernel mode by a first stream of the plurality of streams upon the occurrence of a context shifting event as taught by Ackerman.

32. The motivation for doing so would have been the same as what was given for claim 1, above.

33. As to claim 9, neither Nemirovsky, Ackerman nor Summer teaches saving the context of each of the plurality of streams in a thread context data structure. However, it is well known in the art and would have been obvious to one skilled in the art at the time of the invention that preempted threads have their context

saved to memory in a data structure, so that the context can be restored when the thread is awakened.

34. As to claim 11, Ackerman teaches that an exception comprises a context shifting event (Ackerman, col. 13, lines 10-12).

35. As to claim 12, neither Nemirovsky, Ackerman, nor Summer teaches that a signal comprises a context shifting event. However, it is well known in the art and would have been obvious to one skilled in the art at the time of invention that a signal requires a context shift in order to load values that are needed for the signal handler, i.e., the code that needs to be executed on the occurrence of the signal, into system registers.

36. As to claim 13, neither Nemirovsky, Ackerman, nor Summer teaches that a non-local goto comprises a context shifting event. However, it is well known in the art and would have been obvious to one skilled in the art at the time of invention that a non-local goto requires a context shift in order to change the contents of the system registers.

37. As to claim 14, neither Nemirovsky, Ackerman, nor Summer teaches that a system call comprises a context shifting event. However, it is well known in the art and would have been obvious to one skilled in the art at the time of invention that a system call requires a context shift in order to change the contents of the system registers

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Holloway whose telephone number is (571)270-1899. The examiner can normally be reached on mon-fri 8:00 am - 5:00 pm (alternate fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nabil El-Hady can be reached on (571)272-3963. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DH 4/12/07

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SUPERVISORY PATENT EXAMINER